

COMPUTERWORLD

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Busy Signal: Hallmark of Public Data Communications?

By Ronald A. Frank

CW Staff Writer

Data communication facilities, the segment of the computer industry slated for highest growth rates by most forecasts, are already overburdened or unavailable in many parts of the country.

According to a CW survey, existing data communications users are experiencing regular problems with maintenance, servicing, and error rates, while requests for new facilities and equipment from potential users are subject to significant delays.

Are communications users basically satisfied with present facilities and services?

Does the typical user fully utilize his data capability?

Do the consultants see any solutions?

Are present requests for data link rate increases justified?

What does AT&T say?

In order to get the answers to these and related questions, CW talked to users, consultants, officials of regulatory agencies, and AT&T spokesmen. What emerged was the picture of a communications medium undergoing extreme changes.

This is the first of a series of articles on these changes.

One of several high-volume data users in the New York financial district feels the problem is critical.

"We have had more than 150 Teletype line applications on order for over a month," a company official said. "The situation

is so bad that we have a full-time engineering administrator working solely to expedite our requests for data facilities."

"We've always had trouble," stated a smaller user with several terminals. "We have to be sure we call the phone company data maintenance people in at the same time as our computer customer engineer so Bell can't claim that our computer is causing communications problems."

A California-based data user, planning a network of 250 terminals across the country, will have to wait 12 to 14 weeks per

terminal for installation.

"Our local Bell data marketing man hates to discuss the subject," stated a company spokesman. "He just doesn't know where or when that much equipment will be available."

No Unusual Problems

Some users who got an early start are more satisfied. An official at Control Data Corp., whose nationwide Cybernet communications system has been in full operation for nine months, said that Bell service

(Continued on Page 4)

But Not Software by Itself

Operation of Loaded Computers Is Patentable

WASHINGTON, D.C. — The Court of Customs and Patent Appeals has upheld, in the main, the original decision made in the case of Prater & Wei that computer programs can be patented. But the decision did not uphold the claim for a patent on the process itself.

Morton Jacobs, representing Applied Data Research as a

friend of the court, claimed the decision was a "Magna Carta for the software companies."

The case involved the patent claims made by Charles D. Prater and James Wei of Mobil Oil for a system of reducing errors in spectrographic analysis. The claims were made for an analog device that could make the computations used in the system, but they also sought protection

for the software version of the idea.

The patent was originally rejected by the Patent Office on the grounds that it was only a "mental process" and inherently unpatentable.

The five-to-four decision, handed down by Judge Phillip P. Baldwin, read, in part, "No reason is now apparent to us why,

based on the Constitution, statutes, or case law, apparatus and process claims broad enough to encompass the operation of a programmed general-purpose digital computer are necessarily unpatentable."

One source pointed out that the main reason that the process claim was denied was poor preparation on the part of the claim, not inherent unpatentability. Howard Popper, an attorney representing Bell Laboratories as a friend of the court, noted that it was a decision "in favor of technology and careful use of the English language by patent attorneys."

Other comments have included, "a politic decision," and "a peacemakers' approach, giving everyone something, but not completely satisfying anyone."

The court called for far better

preparation of patent claims, therefore making the patent office happy, according to one source.

The court did uphold the applicants' claim that a properly programmed digital computer performing the specified function fell within the patent rights. The court said, in part, "But once a program has been introduced [into a digital computer] the general-purpose digital computer becomes a special-purpose digital computer, which, along with the process by which it operates, may be patented"

Future cases of possible import, one attorney told CW, are those of Wheeling, Mahoney, and Benson & Tabbot. A decision on the Wheeling case is expected, according to legal sources close to the patent office, in mid-September.

ACM National Conference Opens Aug. 26

SAN FRANCISCO — A range of 19 programs covering information input, processing, and retrieval will be presented at the Association for Computing Machinery's National Conference and Exposition, Aug. 26-28 at the Brooks Hall and the Civic Center.

Discussions will include new applications and techniques used in business and other environments,

ments, and the increased complexity of digital computers.

Normally ACM participates in Afips conferences. However, this year Afips will take part in the exhibit at the ACM meeting.

Attendees will be able to place orders at the Afips booth for copies of proceedings of several recent joint computer conferences and for other Afips publications. Afips will also accept

prepublication orders for proceedings for the Fall Joint Computer Conference as a service to those who will be unable to attend.

A computer-video message center and registration service will be provided at the ACM conference by GE and Conrac Corp.

During the meeting, information on all registrants will be entered into memory. When messages are left for registrants at the message center, their names will be displayed on monitors. Emergency messages will be signified by blinking names.

The conference information center will be located opposite the registration area in the civic auditorium.

Conference proceedings will be available at the distribution counter, located in Room 203 in the Civic Auditorium. Copies may be claimed any day until 6 p.m. during registration by presenting the proceedings stub attached to the registration card.

Special interest features will be the Second Annual ACM Art and Music Festival and the Computer Science Fair.

Other events at the conference will include a no-host cocktail party Aug. 26 at 6 p.m. in the Imperial Ballroom of the Hilton Hotel.

\$14,000 Contract

The Florida State Cabinet last month approved the \$14,000 contract proposed by the Florida Public School Council. Under the contract, the evaluation procedure will be developed by Future Resources and Development, Inc. Programming

(Continued on Page 9)

Separate Pricing Is Leading Topic In Hallway Discussions at Share

BOSTON — The Share meeting opened here under a cloud of uncertainty conjured up by IBM's recent unbundling.

The question hotly debated: Would Share members be willing to continue telling IBM what they needed if IBM would turn around and sell the answers back?

The undercurrent seemed to be in favor of splitting Share away from IBM and making it an independent users group. But there seemed to be an equally strong current toward continuing Share activities as in the past, without change.

The feeling among Guide members attending the Share meeting in connection with joint projects seemed also to be equally divided as to the future of that organization.

There were no general sessions

On the Inside

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Patent Official Calls for Software Protection Study

DALLAS — William E. Schuyler, the new U.S. patent commissioner, last week called for a new form of protection for computer software. The occasion was the 92nd annual meeting of the American Bar Association, and many patent lawyers from throughout the nation were present.

Schuyler seemed to be trying to duck the question of program patents, but said, "Most computer programs are obvious to a skilled programmer given an objective to be achieved on the basis of certain input and storage data." Since Section 103 of the Patent Law prohibits issuance of a patent "if the differences between the subject matter sought to be patented and the prior art

are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which such subject matter pertains," the new administration may be continuing the opposition to such patents.

Schuyler pointed out, however, that tremendous amounts of money are being spent to create software, and that "unless we find some way to protect the result of that creative effort, dissemination and exchange of the information will be stifled and our progress will be retarded."

Schuyler proposed a well coordinated and cooperative study by patent and copyright lawyers and hardware and software producers; such a study to include

the possibilities of legislation and even new forms of protection.

In an interview with CW, Schuyler amplified his call for a study by asking for broad public discussion of how software can be protected and yet progress not be slowed down.

In the course of his talk, Schuyler proposed that the U.S. take a hard look at the methods used in other countries to protect inventions of lesser importance. He said that such methods — which may have a shorter term or narrower scope of protection — could "provide the incentive necessary to stimulate creative effort and marketing of the innovation."

Attorney Reed Lawlor of Los Angeles, who has worked in the field of program protection for many years, told CW that the

commissioner's concept is somewhat similar to that of the "Gebrauchmuster" or Petty Patent that is available in Germany and provides protection for 10 years instead of 20. Under certain circumstances, it is possible for an inventor to obtain both a Gebrauchmuster and a regular patent.

Dr. Myron Tribus, assistant secretary of commerce for science and technology and former dean of the Thayer School of Engineering at Dartmouth, in another address to the patent lawyers called for computerization of patent searching. He said the present system is "becoming obsolete."

Now, said Tribus, "we can look at the state of the art and see promise of a computer capability large enough, flexible

Nixon Schedules Computer Aid For Unemployed

WASHINGTON, D.C. — As part of the new domestic program being proposed by the Nixon Administration, government-supported computerized job banks will be set up by the U.S. Department of Labor.

Under the Manpower Training Act, job banks would be operated in 36 cities by state employment security offices.

Quoting the President's proposal, the job banks would match the unemployed with available openings to "aid the disadvantaged and to help people off welfare rolls and onto payrolls."

Initial funds allocated to the program would be used to develop the job banks on existing computers already in use by the employment security offices. Within five years, however, the individual banks would be interconnected by communications facilities, to help unemployed workers who would be willing to relocate to find jobs.

One significant point of the plan states, "Maximum effective use shall be made of electronic data processing and telecommunications systems in the development and administration of the program."

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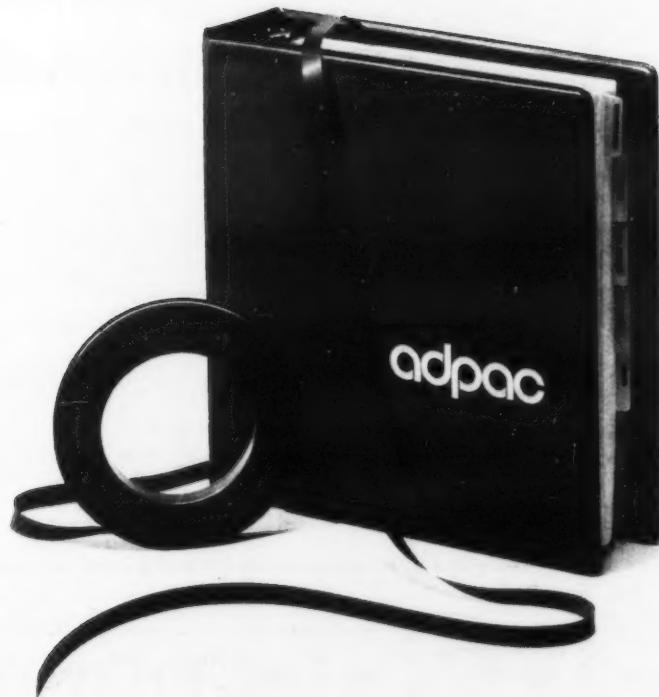
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Competitive Microwave System Wins Landmark FCC Approval

WASHINGTON, D.C. — Private firms are now permitted to compete with AT&T, under a recent decision from the Federal Communications Commission in a ruling concerning Microwave Communications, Inc. The firm applied for and received permission to offer microwave service for sale between Chicago and St. Louis, at rates to be determined by the firm. The rates are reputed to be substantially below those offered by AT&T or Western Union.

Data Transmission Included

Uses will include voice, teleprinter, facsimile, and data transmission and will permit channel-

sharing for up to five users per channel. Channels will be leased for an additional 25% discount between the hours of 6 p.m. and 6 a.m., the report stated.

The commission stated that, in spite of claims to the contrary, the firm appeared to have sufficient funds to construct the system and operate for at least one year.

Strong opposition came from Western Union, General Telephone of Illinois, and the Associated Bell System companies. An AT&T spokesman was quoted as saying, "We will, of course, continue to do what is needed to be sure our services on this route fully meet the requirements of the public."

The FCC pointed out that it could find no reason to deny the request, based on information presented by all parties involved.

Joan Van Horn, president of the time-sharing section of Adapsco, said, "I believe it is important to look at all innovations that can lead to better service, lower rates, and technological advances. The rationale of monopoly for telephone service may have seemed technologically sound 50 years ago, but it may no longer be justified in the light of present technological advances. I believe that it is time the whole monopoly rationale be thoroughly reappraised."

Busy Signal: Hallmark Communications?

(Continued from Page 1)
and maintenance has been satisfactory, and no unusual operating problems have occurred. The official added, however, that a delay was encountered in initial

Catalog of Standards Published by USASI

NEW YORK — The USA Standards Institute has published its 1969 catalog of USA standards and international recommendations. Some 600 USA standards and 300 international recommendations have been added.

Copies of the catalog are available free from the institute at 10 E. 40th St., New York, N.Y. 10016.

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ly getting the data equipment installed, but the delay had been expected, and orders were placed with enough lead time to cover the situation.

The prevailing mood of users seems to lean toward grudging acceptance of the situation. The manager of communications engineering for a Texas firm with data links to six cities said that even the phone company itself admits that major emphasis is not concentrated on the improvement of data facilities.

Emphasis on 'Pots'

"Bell states that it is primarily committed to 'Pots,'" the manager said. Asked to explain the term, he offered Bell's definition as "Plain Old Telephone Service."

But when equipment is installed and operating, users still complain about service and maintenance.

"Last month it took us more than one hour to get a clear line," said a New Jersey data link subscriber. "We're using ordinary dial-up lines, and the noise and cross-talk condition are very bad. Normally we have learned to live with a 5% error rate for this type of service, but we have been encountering up to 20% error rates on our lines."

In-House Diagnostics

The subscriber added that his firm has developed an in-house diagnostic capability to trouble-

shoot data lines in the event of transmission problems. Furthering this trend, data terminals with diagnostic capabilities are now being marketed by several firms.

Although on-site communications engineering is being utilized by users, most data subscribers must still rely on the telephone company for maintenance of their data links.

Asked if the Bell data service were adequate, a Southern user said, "Every now and again you find an extremely competent maintenance engineer, but when they really know their communications, they usually receive tempting offers from data users."

A Developing Situation

The entire area of data communications reliability, availability of equipment, and requests for tariff increases is currently under official scrutiny by several government agencies.

As the situation develops, the average data user's level of satisfaction will become a matter of primary concern.

Next Week: What the consultants say.



Iomec Series 1000 Data Storage System

Independent Disk Drives Designed for 1130, 1800

MENLO PARK, Calif. — Disk drives compatible with IBM's 2310 (the only drive for the 1130, and the first one sold for the 1800) are scheduled for first delivery in 90-120 days. The new devices are faster, larger, and less expensive than the 2310, according to the developer, Iomec, Inc.

The Series 1000 is led by the Iodisc 1012. This is a two-disk (one removable), four-head unit, similar to a twin 2310. Its average access time of 70 msec compares to 520 msec for the 2310; comparable capacities are 20,480,000 bits (sector mode) for the 1012, against 16,442,000 for the twin 2310. Comparative costs favor the 1012 ("under

\$15,000 for OEM) over the 2310 (\$20,880).

Also in the 1000 Series is the 1011, a single-disk option that offers more storage.

The company, located at 345 Mathew St. here, said it can also interface the new disks to other computers.

Iomec is managed by a group of men with IBM experience in the planning, design, and manufacture of magnetic storage devices.

While Iomec is largely interested in the OEM market, a company official said that it will consider selling to end users if enough can be found in dense population areas to justify arranging third-party support.

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Computers Helped Bring Mars Photos to Home TV

PASADENA, Calif. — Television viewers across the nation watched computer-controlled real-time pictures from Mars on their home receivers last week.

Utilizing two Univac 1219 central processors, a newly developed system at the Jet Propulsion Laboratory converted raw data from the Mariner 6 and 7 spacecrafs into images com-

patible with equipment operated by the television networks.

Real-time data received from 58 million miles in space was relayed by the Goldstone tracking station to JPL where the 86.4 kilobit/sec block-encoded data stream was converted into a 16.2 kilobit/sec byte-sequenced data stream for processing by the first, or 1219A CPU.

From the A system, the data was recorded on magnetic disks capable of storing four separate TV images, each consisting of approximately 750,000 separate elements of information.

To transcribe the continuous stream of data the A system extracted line-by-line picture-synchronized signals which were simultaneously recorded onto 70

mm film. From the newly processed film, Polaroid still photos were taken for television transmission.

Although the television networks received images as they were processed, the JPL system was able to vary brightness and contrast for later study by scientists.

The TV pictures can be viewed in three separate magnification modes, giving detail which ranges from a one-for-one image up to a times-four magnification providing close-up detail.

After being relayed to the television networks and recorded on film, the Mars images were fed to the 1219 B system which electronically adjusted picture brightness and contrast in addition to processing scientific data received from the Mariner probes.

The B processor performed nonreal-time analysis of variables

including temperatures and gases sensed by the spacecrafs.

The video real-time system was developed in only three months by a team headed by JPL systems design engineer Ralph Johansen. Working in conjunction with software specialists from the Planning Research Corp., and assisted by a team of specialists from equipment manufacturers, the real-time process supplemented existing monitoring systems used on earlier Surveyor and Mariner flights.

In discussing future applications, Johansen revealed that the forthcoming 1971 Mariner probe will include spacecrafs in both equatorial and polar orbits, thus raising the possibility of a nearly complete mapping of the entire planet.

During that exploration, video images can be relayed again to TV audiences, if officials give the go-ahead, he added.

X3 Approves 5 Draft Standards

NEW YORK — Five new proposed standards have been approved since April by the members of USA Standards Committee X3, Computers and Information Processing.

The proposed standards are: (1) Magnetic Tape Labels for Information Interchange, (2) Revision to X3.11-1966, General Purpose Paper Cards for Information Interchange, (3) Revised Hollerith Punch Card Code, (4) Revision to X3.12-1966, Vocab-

ulary for Information Processing; and (5) Flowchart Symbols and their Usage in Information Processing. X3 took action at its July meeting to authorize the forwarding of these proposed standards to the sponsor, the Business Equipment Manufacturers Association, for submission to the USA Standards Institute for final approval.

Two draft standards were approved at the July meeting for publication and subsequent

letter ballot. They are: Standard Presentation of Alphanumeric Characters for Information Processing, and Data Code for Calendar Date for Machine-to-Machine Data Interchange. In addition, two revisions of present standards were approved for letter ballot without publication: Revision to X3.2-1963, Print Specifications for Magnetic Ink Character Recognition; and Revision to X3.3-1963, Bank Check Specifications for Magnetic Ink Character Recognition.

X3 approved the recommendation of Subcommittee X3.2 that it be restructured into two groups: one to deal with codes, formats, and related matters; and the other to consider standards for physical input/output media. Action to effect this change will follow the Aug. 28-29 meeting of X3.2.

In July 1968, the central secretariat of the International Organization for Standards (ISO) circulated to member countries a draft proposal on the Writing of Dates and Numbering of Weeks. A USA negative vote along with preliminary comments objecting to the manner of presentation and lack of clarity in the proposal was sent to the central secretariat in March 1969. X3 authorized a 30-day letter ballot to establish a final USA position on the proposal.

System Eases Problems After Warehouse Burns

BOSTON — A communications-oriented computer warehouse distribution system has helped to lessen the impact of a supermarket warehouse fire described by officials as the second largest fire loss in the country this year.

Operated by Stop & Shop Corp., the warehouse normally processes orders from 138 supermarkets in New England, New York, and New Jersey.

To alleviate the distribution problems created by the loss of the warehouse and its contents, the company's data processing center is converting store orders to data formats used by individual wholesalers.

"In some cases this requires conversion of data to magnetic tape, paper tape, or punched cards," said Frank O'Sullivan, data processing manager.

"During this interim period, we are sending the converted data to the wholesalers who are generating the required documents and then shipping orders directly to our stores," he added.

Usually store orders are handled by the company's data processing center here.

"When store orders are received, all data is transcribed from paper tape for entry into our System/360. The computer then prints out warehouse selection documents and store invoices," O'Sullivan said.

SDS Is Pondering Separate Pricing

EL SEGUNDO, Calif. — Scientific Data Systems will announce its position on the separate pricing of hardware, software, systems engineering, and customer training activities by Oct. 1.

"We have been following, with interest, the recent announcements of other computer manufacturers regarding their unbundling plans," said SDS President Max Palevsky. "We have been reviewing all of the options available to us and will reach our decision on this matter soon."

SDS, a Xerox subsidiary, has marketed separately a software package for business data processing applications for the past three years, and, more recently, packages for simulation and linear programming, an SDS spokesman said.

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Scientific Terminal

ANN ARBOR, Mich. — "No formal training in analog, digital, or hybrid programming is required for either students or their instructor" is the claim made for a system on which up to 64 students, engineers, or other people with math-scientific problems can share one processor.

The Dynamics Terminal from Applied Dynamics Inc. operates, in conjunction with the company's AD/Four, or /Five, analog/hybrid computers, to solve problems in a wide variety of areas including mathematics, engineering, and the physical sciences.

Processors are available at prices starting near \$20,000 for the smallest Ad/Four, 10-volt system. A terminal, consisting of key and visual panel, costs about \$2,500 to \$3,500. The company says it will provide full user problem software.



Data/Tape 2100

The company address is Box 1488, here.

Typewriter Uses Tape

ROLLING MEADOWS, Ill. — A standard office typewriter (IBM Selectric) has been equipped to function also as a remote terminal and, through a cartridge-loaded magnetic tape subsystem, as a data collection unit.

The Microdyne DCT typewriter has been operating for over two years; however, the tape system is new and could be a useful attachment.

The tape is incremental and offers speeds from 5 to 30 in./sec at densities up to 556 bit/in. It is sprocket-driven, rather than using the more conventional pinch roller drive.

In quantity, the unit costs about \$1,250, plus \$750 for the tape system. Delivery is from stock.

Microdyne, Inc., 1600 S. Hicks Road, Rolling Meadows, Ill. 60008.

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Donald Habeger
 9841 Airport Blvd., Suite 524
 Los Angeles, Calif. 90045
 213-641-3170

Man/Machine Problems Cited

Real Estate Board Drops Computerized Listing Service

By Joseph Hanlon

CW Staff Writer

MINNEAPOLIS, Minn. — Use of a computerized real estate listing system has been discontinued by the Area Board of Realtors Multiple Listing Service (MLS).

"When we first went on the system, we thought it would be the greatest thing to happen in real estate in years. But it hasn't turned out that way," declared Larry Kunningham, director of membership services for the Minneapolis MLS.

With the system, all housing listings are kept in a central computer. Each agent has a terminal, and by inserting criteria such as price range and style, he can get a listing of all homes in his area which fit the criteria.

Local MLS members have been using the Detroit based Realtron system since last fall, and voted overwhelmingly in June to discontinue it. Service was stopped Aug. 1.

Rapid Turnover Cited

Kunningham cited three problems with Realtron. First, it was not suitable for Minneapolis, he said, because Minneapolis has a very high turnover, with few houses staying on the market for more than a week. "The main use of such a system would be to keep track of lots of listings," he explained.

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Second, the agents had trouble adapting to the computer. Under the system they have returned to, printed sheets with descriptions and photographs of houses are distributed to members each day. Agents disliked having to call the computer for listing and not having the pictures.

Information Inaccurate

Finally, agents complained that they were not receiving accurate information. According to Kunningham, salesmen were not consistent in their use of terms in furnishing data. A style description might mean one thing to one salesman and something else to another. When a style was

input by an agent, the output listing of houses might not all fit his understanding of what that style was.

Kunningham summarized by saying: "It boils down to not teaching an old dog new tricks."

Tom Ervin, vice-president of Realtron, said, "Those are not the real reasons" Minneapolis MLS dropped Realtron. But he refused to elaborate or make any other comment.

Ervin reports that Realtron now has systems on-line in 60 cities and contracts for 22 others. He also said that Minneapolis was the only city to drop Realtron after beginning the service.

With Realtron, all listings are kept in an IBM 360/40 in Detroit. Each agent has a terminal, and he calls Detroit toll-free to get information. New listings are keypunched at a central location in each city, and then entered into the computer.

Minneapolis had terminals. Members paid \$30 per month for the service. But in June MLS polled its members, who voted 93-32 to drop Realtron and return to the old system. Use of Realtron was discontinued Aug. 1.

Computerization Retained

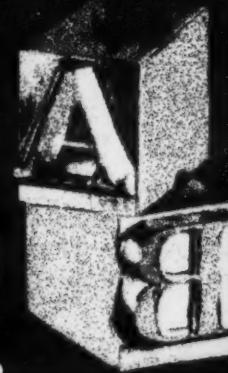
In the return to the old system, some computerization is being retained. Agents will still submit information in a format ready for keypunching, and typesetting for the daily listing sheets will be done by computer. Also, MLS will attempt to provide some of the reports which were provided to members under Realtron.

Service Began Last Fall

Minneapolis began using Realtron last fall. At first, MLS maintained two systems, the old one for people without terminals and the new one for agents with terminals. But as of March 1, the old system of distributing printed sheets of new listings daily was dropped.

At its peak, 158 realtors in

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Editorials

Privacy Lost?

The bill to implement President Nixon's national computerized job bank program does give the secretary of labor the power to prescribe "rules and regulations to assure the confidentiality of information submitted in confidence" to one of the banks.

But nowhere is there any mention of the key point made by President Nixon during his election campaign. At that time, he stressed that only jobs would be stored. Applicants would not have to input their names, he said, only their qualifications. This would assure privacy and eliminate any possibility that additional personal records would be gathered and stored.

While the absence of this precaution from the bill does not mean this safeguard will not be included in the final program, we would be much happier if it were spelled out in the bill.

The Need to Know

The exchange of information among computer users is vital to the development of the computer field. This is no secret and is the main reason for the formation of societies and user groups.

Computerworld, the user's newspaper, is designed to improve this exchange of information.

Occasionally an enthusiastic user, in one of our stories, describes something as a first — and he's wrong.

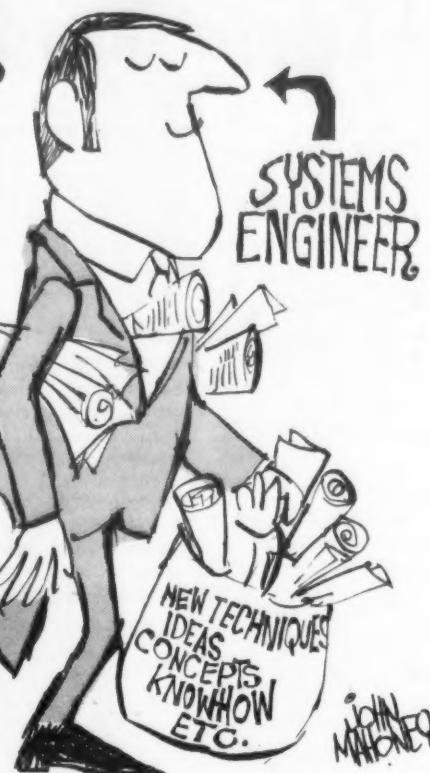
When this happens, we get letters from other users giving additional information on the subject. This is welcome. This is how all users can keep up with the latest news.

But what we do not like is when these letters imply that either the user quoted — or CW — is trying to mislead the readers, apparently for some unethical reason. This type of reaction can only stifle the exchange of information. For which user can, in this fast-moving field, be sure he really is doing something for the first time? If users, and CW, had to withhold publication of stories until it was absolutely certain something was a "first," we could never run the stories. In doing so, a great deal of useful new information would be lost to our readers... the computer community. We like to get letters. Keep them coming... we like to be kept on our toes.



Off to Market

USER'S COMPUTER CENTER



Letters to the Editor

360/30 Handles Communications, Background Batch Processing

In regards to your news article "360/30 Partitioned for Multiprocessing" (CW, Aug. 6), please be advised that Management Science, Inc. of Appleton, Wis., was operating a superior system in an IBM 360/30 as early as March of 1968.

In the MSI system, foreground 1 handles message control functions, foreground 2 does the communications processing in a *real-time* mode, and the background partition performs on-site batch jobs. The communication system is on a "demand" basis; that is, each terminal dials the computer versus the computer calling the terminal. The system currently serves 60 physicians in Michigan, Wisconsin, and Illinois.

Thomas H. Tess
Vice-President

Management Science, Inc.
Appleton, Wis.

Partitioned Mode Implemented On 360/30 by College Faculty

In view of the enclosed description of a system called Dros, it would appear that the article printed in the Aug. 6, 1969, issue of *Computerworld* entitled "360/30 Partitioned for Multiprocessing" is not accurate. It is not the only 360/30 system being used in a partitioned mode. Dros was developed at the College of William and Mary under the direction of Dr. Southworth. It took more than a year to develop and has been operational for more than one year that I know of.

Dominic Bordonaro
Director, Systems & Data Processing
Ithaca College
Ithaca, N.Y.

New Time-Sharing Bureau Clarifies Details of Services

Needless to say, we are pleased that you published a report on our new time-sharing services [CW, Aug. 6]. There are a few points, however, which deserve clarification.

The figures quoted which compare the performance of our PDP-10 to the IBM CP-67 system have us somewhat red-faced; the data refer to a single benchmark, and may not be representative.

The PDP-10 does not have a "virtual" memory management system, as the term is generally used. (However, our system has been augmented with a number of significant hardware and software features.)

The "graphics package" referred to as "Aids" is actually AED (Algol extended for design), a powerful systems programming language which is useful in many areas, including graphic terminal support.

The Ards graphic terminal is only one of a class of storage tube displays which we intend to support.

I hope these points will resolve any misunderstanding about the nature of our services.

Tom Barnett
Director of Market Planning
Codon Computer Utilities, Inc.
Waltham, Massachusetts

Vermont Data Processing School

Claims First VA Accreditation

I feel compelled to point out the error of a statement in your report under "Education" (July 30, 1969) to the effect that CEI of Burlington is the first data processing school in Vermont to receive accreditation by the Veterans' Administration. The Data School of the Southern Vermont Computer Center in Bennington was awarded accreditation by the Veterans' Administration in January of 1969 and to our knowledge was the first such school in Vermont to receive accreditation.

Data School is part of the Southern Vermont Computer Center organization, which offers data processing services to the tri-state area of southern Vermont, Massachusetts, and eastern New York. An IBM 360/30 is used in our Data School courses, which include RPG, Cobol and BAL programming, systems analysis, and keypunch. The Data School has been actively involved in computer education for over three years and works directly in the placement of students as well.

Data School and the Southern Vermont Computer Center are located at 219 Ben Mont Ave., Bennington, Vt.

Fred C. Keppler
Vice-President
Southern Vermont Computer Center
Bennington, Vt.

Computerized Teacher-Grading System Raises Doubts

(Continued from Page 1)

will be done by Shared Computer Systems of Miami.

Dr. John E. Tirrell of Future Resources said that educators have been "reluctant" to go beyond years of experience and years of education in rating a teacher. "We want a more objective evaluation of teacher performance," he said.

Rate Effect on Students

Tirrell explained that Future Resources plans to evaluate teachers by rating their effect on students. Because of the small size of the contract, he said, they will be able to consider only improvement in the students' academic performance under the teacher. They would also like to consider other ways in which the teacher affects the student, such as motivation, but they will suggest only directions for further research in these areas.

How will Future Resources evaluate a student's academic performance? Standardized tests provide "an easy way," noted Tirrell. "But we don't want to limit ourselves to that" because they are not sufficiently accurate, he added. "It has been proven that these things [tests] have a cultural bias," he said. Because of the small size of the contract, the firm probably will not be able to develop better tests, but hopes at least to "suggest" other kinds of tests.

'No Harder Than Business'

Evaluation of teachers is no harder than evaluation in business, and may be easier, declared DeLange. He concedes there are problems with any such system, but feels that the benefits outweigh the difficulties.

DeLange agreed that such a system will force teachers to be responsive to the criteria of the computerized system. But if the criteria are properly selected, he said, this will be good.

Both Tirrell and DeLange have experience in education administration. Both have experience with IBM's personnel evaluation system — DeLange as an employee and Tirrell as a consultant on personnel evaluation, they report.

Educators Dubious

Professional educators told CW they were dubious about the possibilities of setting up a computerized evaluation system. George Sweat, legislative consultant for the Florida Education Association, declared that \$14,000 "surely" wouldn't be enough for a project like this.

Ingram said: "I won't say it can't be done, but it seems highly unlikely. Principals have been knocking themselves out on this for years. There is no foolproof objective way to evaluate performance."

He warned, "The product of an individual's work takes longer to show up with a teacher than a business executive," and he objected to using "statistical methods to arrive at something as important as competence." Finally, he was afraid that "computers used in this respect would frighten a great many teachers."

The Professional Practices Commission is a state agency engaged in policing teachers for "incompetent" performance.

Ingram explained, "We are concerned only with the grossly incompetent."

The commission has developed what Ingram calls the nation's first set of criteria for teacher evaluation. It is a four-page list of areas of evaluation. The criteria include utilization of available instructional material, such as audio-visual aids, whether the teacher encourages expression of ideas, and whether he extracts major themes or ideas from the statements of others.

The actual evaluation is done by another teacher. Ingram explained, "A fifth-grade teacher knows best what should be happening in a fifth grade." He said that the commission stressed subjective evaluation by peers.

Tirrell described Future Resources as a consultant "all

levels" to business, industry, and education. He said that the company was already developing college courses and doing a nationwide personnel evaluation for

Connecticut General Life Insurance Co. Future Resources, a subsidiary of Famous Artists Schools, began operation April 1 and now has a full-time staff of

15, according to Tirrell.

The Florida Public School Council is a 15-man lay advisory board that studies education in the state.

Bylaws Drafted for New 'SicSic' Group

BOSTON — Bylaws for a new ACM special interest committee on the social implications of computing have been drafted and submitted to ACM officials by the committee's sponsors. The original committee was dissolved last winter by ACM on the grounds that there appeared to be no interest in its existence.

Jean Sammett, chairman of the ACM Committee on Special Interest Groups and Committees, had initially opposed the new committee. But last week she

told CW, "It's now clear to me that there is a need for such a group."

Robert P. Bigelow, sponsor of the petition to set up the group, has submitted the proposed bylaws to Miss Sammett and Bernard Galler, ACM president. The proposed bylaws also have been sent to the 160 people who expressed interest in working with the group.

Several of the sponsors plan to meet soon with Miss Sammett to

review the bylaws. At its Aug. 24 meeting, the ACM Council will consider the request to form the special interest committee.

Miss Sammett told CW: "I have studied the material very carefully and consider it a reasonable approach. There are a few substantive changes I intend to suggest. It is clear to me that a significant number of reasonable people within the ACM are interested in an activity of this sort, and efforts must be made to satisfy their needs."

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June 25

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July 16

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August 13

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COMPUTERWORLD

education

Classroom Aid Interests Students

By a CW Staff Writer

MINNEAPOLIS — A new classroom aid has been developed that tests assimilation of material; makes instruction faster, easier, and more efficient; and keeps students interested and alert, according to the manufacturer.

The Industrial Training Student Response Monitor, from E and M Industries, Inc., 6853 Oxford St., is manufactured in a standard 30-unit system, but can be supplied with any number of student stations desired.

The monitor works this way. The instructor asks or displays a question and offers up to five answers. Each student pushes a button on his console for the correct answer, then pushes the "interrogate" button.

All correct and incorrect answers are displayed on the instructor's console by green and red lights. Lights also indicate correct or incorrect answers on the student's responder.

A student having an incorrect answer may select other answers until he gets a green light.

Effective Schooling, Grading Achieved

KENYA, Africa — Computer techniques employed by the Kenya Ministry of Education enable it to extend the period of effective schooling throughout its 4,000 primary schools. It also reduces the waiting period for the results of the final examinations taken by over 170,000 primary school children.

This has been achieved by designing answer sheets for the Certificate of Primary Education examination so that they can be graded by computer.

Last November, 510,000 answer sheets were read into an ICL 1902 computer by an ICL document reader and recorded on magnetic tape. The job took 80 hours, one week of computer time. The same number of hours was taken to mark the papers the previous year, but 500 teachers were required. In addition,

results had to be punched onto cards and verified, which effectively doubled the time taken.

There were certain "human" refinements built into the system, so that if, for example, an answer sheet had a dark mark and a faint mark giving different answers to one question, the reader chose the more pro-

nounced mark.

ICL's User Programming Service in London created the program for this system. Certain modifications will be made prior to this year's examination, and other examinations will be investigated to see if the document reader could be used to mark them.

Dartmouth Film On Time - Sharing Depicts Wide Range Utilization

HANOVER, N.H. — A new, 15-minute documentary film, "Educating a Computer: A Report on Dartmouth Time-Sharing," has been produced by Audio-Visual Communications of General Electric Co., under the direction of John Duncan.

The color film depicts the

range of academic disciplines now utilizing the time-sharing computer facilities at Dartmouth's Kiewit Computation Center for both educational and research purposes.

It also indicates the impact that the Dartmouth time-sharing system is having on education.

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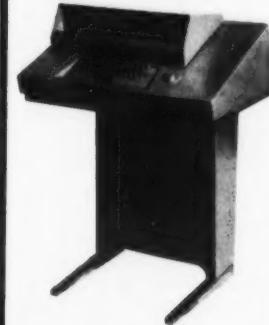
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August 27, 1969

Page 11

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BRANCH	QTRLY INT	ANNUAL INT	INT APPLIED	TO PRIN TODAY	PRINCIPAL	SUSP. INT.	SINGLE INT	CHANGES IN DAILY ACCRUAL	NET CHANGE
01	376.25			497.01	410,773.04	1,722.21	56.1220-	.0685	56.0543-
02				81.78				.0112	.0112
03	125.00			56.0543				.0132	.0132
04	125.00	25.95	1,043.60					.0148	.0138
05				174.09				.0240	.0240
06				57.35				.0079	.0079
07	1,418.33	302.29	1,425.25					.1972	.1230-
08				495.12				.0743	
09				687.50				.0694	.0694
10				28.18				.0953	.0953
11								.0038	.0038
AGGREGATE	2,119.58	347.70	4,500.20	410,773.04	1,722.21	56.1220-	.6330	.1415-	55.6305-

Report of daily matured/renewed adjustments show all current accruals for each type of account

ABC NATIONAL BANK FILE MAINTENANCE REPORT FOR 11/10/68									
C.O. NO.	BR	TR CODE & DESC.	FILE INFORMATION...	...NEW INFORMATION...	REMARKS.....				
0000038	10	80 AGD TOT INT	.00	687.50					
0007007	2	10 NEW CO		1305.00	5.500 20.3425				
		11 NEW RIA			J. J. JONES				
					1414 DISK RD.				
					NEW HOPE 18674				
0007004	4	80 NEW SSR		234411123					
0031146	5	80 AGD TOT INT	25.18	70					
0031326	6	80 AGD TOT INT	.00	101.90					
0031576	7	90 RED MRT		110568					
0033515	4	90 RED MRT		110568	10000.00 VARIANCE OF .00				
0034698	2	68 RECD MRT	.000		4309.55 VARIANCE OF .00				
0034609	1	65 SET-HOLD							
0036451	3	CHG RATE	5.000	.1460	4.206	.1251			
0036461	2	90 NEW SSR		21210141	5109.86 VARIANCE OF .00				

The file maintenance report provides the complete source for each entry

On-Line File System for System/360 Supports Sanders and IBM Displays

SAN FRANCISCO — Robin, an acronym for remote on-line business information network, is the name of a new software package for the S/360.

The package operates under either OS or DOS and requires a minimum memory size of 128K. Minor alterations are necessary for the DOS version, according to the originators, Greyhound Computer Co.

The basic purpose of Robin is to support large-scale, on-line file systems. Remote terminals supported include the Sanders 620 and 720 CRT displays and the IBM 2260 and 2740 typewriter terminals.

Telecommunications are handled through the use of the standard IBM basic telecommunication access method, and the system supports all standard I/O mod-

ules, according to the company. The basic features for the system include on-line file inquiry; unlimited record size through terminal paging; on-line file maintenance through built-in update logic; and on-line transaction processing, including the computation of results based on combined input data and accessed information.

Also included are updating and posting to on-line files; spooled output for larger reports; and on-line data entry with data validation procedures, the company said.

The programs used to handle the actual processing logic may be written in any language supported on the S/360.

Built-In Multiprocessing

The company claims that

Robin operates as a "multi-thread" monitor. In other words, the package schedules several related and unrelated activities into a single cycle for simultaneous processing. It is claimed that this type of processing will significantly improve the transaction load for an on-line system.

All user-written modules are operated as re-entrant coding. This permits several different users to access the same coding, each with his own work areas and stored values.

All I/O devices supported by the S/360 can be used with Robin, the company said. The package is offered either as a service or by a lease agreement. The company's offices are at 101 Howard St.

'Imarex' Information Retrieval Offered

METUCHEN, N.J. — A generalized information retrieval system known as Imarex has been developed and released by Gulton Industries, Inc. It will, the company claims, allow the user to manipulate several simultaneous files for either extraction or updating and incorporates the use of multilevel logical descriptions for the updating or reporting criteria desired.

The company is located at 901 S. Highland St., Arlington, Va. The package is being marketed to both private companies and service bureaus.

New Accounts Payable System For S/360 Users

GREAT NECK, N.Y. — A new accounts payable system incorporates weekly runs that gen-

erate both the necessary weekly and the monthly reports.

Computer Processing Corp. says their package, selling for \$16,000, is available through the National Software Exchange located at Station Plaza East.

The system regularly produces edit reports, invoice registers, payment checks, cash requirements reports, and cash disbursements reports. The monthly reports include a purchase journal and an expense report.

Entry Order System Gains A New Software Package

MONTCLAIR, Calif. — Mode-100 (model for optimizing data entry) is new software package for the MSI-100/200 electronic ordering system.

Marketing Systems, Inc. claims

that Mode-100 will process any type of data, including order entry, cash/sales reporting, payroll, or inventories that can be recorded and transmitted by the MSI Series recorder-transmitter.

The company is located at 4751 Holt Ave.

Data Management System Has Multifile Support

NEW YORK — Prism, a generalized data management system for the S/360, is now available from Cybernetics International Corp.

Offering multiple-file support and a specialized language for reporting and retrieval, Prism can be leased from the company or purchased outright. The company offices are at 280 Park Ave.

Certificate of Deposit System Is Offered

By Peter L. Briggs

CW Staff Writer

JENKINTOWN, Pa. — Cerdacs, a new certificate of deposit accounting system, has been developed by Computer Systems Technology, Inc.

One major aspect of the system, as reported by a prospective user, indicated the extreme completeness of the documentation and the step-by-step systems specification for installation.

An important feature, the company claims, is the complete audit trails maintained by Cerdacs. All figures have cross-checks against the entry point, as well as each total accumulated.

Configuration

Written in RPG and Cobol for the S/360 under DOS, Cerdacs requires a minimum 32K machine, three disks, two tapes, a card reader, a printer, and a punch.

Documentation showed exceptional care and thought in preparation. Each stage of the manual processing of deposit certificates has been provided for, and conversions necessary to use the new system have been detailed.

Originally developed by the United Penn Bank, Cerdacs is being marketed by Comstec under an exclusive agreement.

System features include daily matured/renewed adjustment report, new certificate processing, weekly certificate controls, breakdown analyses by amount, maturity date, interest rates, and a listing of upcoming maturations for a given month.

Reports produced with Cerdacs include posting journals, file maintenance registers, trial balances, check registers, renewal notices, interest checks at desired periods, 1099 forms, cessation of interest accrual, and unredeemed matured certificates.

Controller documents include reconciliation transactions, check registers, daily matured and renewed adjustments, and complete trail analysis for auditors.

The system, according to the company, anticipates the reports required by both the FDIC and the IRS, projects the cash requirements for any desired time period, reports interest accrued daily, and processes either negotiable or non-negotiable, fixed, or automatically renewing certificates.

The package is available for \$6,500 and includes complete installation support, maintenance, and total documentation. The company's offices are at Suite 400-42, Fox Pavilion.

'Time-Shared' Time-Sharing

FRAMINGHAM, Mass. — A new innovation in the service area has been introduced in the form of time-sharing sharing.

Iteration Associates, a local firm, has made arrangements to perform problem-solving time-sharing for firms that do not have enough work to justify the in-house use of a terminal.

By dialing a special number, the customer can dictate a problem to an operator, who will then program the data and obtain a solution.

It is claimed that a solution will be phoned back to the customer, generally within an hour.

The technique has been de-

scribed as "the logical extension of the slide rule."

The expected cost for a normal problem will run, according to the company, in the neighborhood of \$20, with the one-hour response.

The company's offices are at 44 Fox Hill Road.

Bank Vault Used To Guarantee Film Security

NEW YORK — A new customer record security system has been installed at the Computer Output Microfilm Center of the Installations and Research Corp.

A walk-in, bank-type vault located on the premises serves as a depository for customers' magnetic tapes both before and after data is transferred to microfilm. The same service is provided for finished microfilm, after copying.

The history of all incoming tapes and films is recorded on registry cards maintained by security personnel, who have complete responsibility for the entire conversion process. Twenty-four-hour protection is provided for the vault.

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'Stat:Com' Offers Processing on 1108

CHICAGO - Stat:Com, a computer service designed specifically for scientific and engineering problems, has been developed by

Services

Statistical Tabulating Corp.

The service utilizes a Univac 1108 CPU connected to remote terminals, and the user can enter data either from his office or from one of the company's service bureaus located across the country.

The service is directed toward the specialized, large-scale, core-dependent problems encountered in the course of engineering research and development activities.

The company's offices are at 104 S. Michigan Ave.

Westinghouse Opens Telecomputer Center

PHILADELPHIA - Westinghouse Electric Corp. has just opened a Telecomputer Service Center here.

Aimed initially at numerically controlled machine services, the first package offered will be Camp, a numerical control programming system.

John J. Kane is manager of the facility, which is connected directly with the company's 360/75 ASP systems, two RCA Spectra 70/46s, and a Univac 1108.

The master systems are located in Pittsburgh and Baltimore.

Local peripheral equipment will include high-speed printers, paper tape punches, card readers, and biaxis plotters, all of which can be used for output by the terminal users.

Management Reporting System to Be Offered

FORT WASHINGTON, Pa. - Users of the Access Systems data services now can utilize a centralized information retrieval and file management service. Developed by Industrial Information, Inc., the package incorporates a terminal language, as well as prewritten coding for file manipulation, and is available separately. The complete package and service is available from Access Systems, Paramus, N.J.

Time-Sharing Service Offered in Los Angeles

LOS ANGELES - Time-sharing users in the Orange County area now can access a service offered by Intranet Industries, Inc.

The system software, developed by the company, is used to operate the Univac 1108. It utilizes hardware designed by the company and several other manufacturers.

Additional sites are being planned. Company offices are at 9841 Airport Blvd.

New Prices Established For Com-Share Users

ANN ARBOR, Mich. - Effective Sept. 1, Com-Share will have a new price structure for its nationwide time-sharing service.

The changes are being made in conjunction with the introduction of the new W-04 operating system and will reflect additional capabilities.

New prices are 3 cents per day per disk block, with connect time either \$14 or \$10 per hour, depending on the type of usage.

CPU time will be billed at 3 cents per unit, and the new monthly minimum will be \$400 per account number at the \$10 connect rate, the company says.

Corporate offices are at 1919 W. Stadium Blvd.

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Seafood Producer Controls Distribution Through Computer-Assisted Scheduling

GLOUCESTER, Mass. — A seafood producer is using a computer to help solve the logistics of shipping fish from all over the world to processing plants, warehouses, and retail outlets throughout the country.

When fishing was a regional industry, consumers ate fish within days after it was hauled from the sea. But today the industry has become an interna-

tional operation, and the quick-frozen product may be shipped half way around the world before it finds its way to dinner tables.

To help supply its processing plants with the variety of fish used in its line of seafood, the Gorton Corp. is using an IBM System/360 Model 30 in ways novel to the seafood industry.

Gorton is using its computer to arrange for the purchase of fish from a variety of sources ranging from the rice paddies of India to the frozen seas off Iceland.

The computer also is used to forecast demand and plan processing of the nearly 125 million tons of clams, crabs, salmon, tuna, and shrimp the company

cans or freezes each year.

"Gorton sells to some 500 trading areas throughout the United States," says Jonathan Bayliss, director of management services. "Our computer helps us distribute available products to the right markets at the right time. This is very important in an industry where demand is often heavy but of limited duration."

"In frozen foods, it costs more to keep products in inventory than it does to handle them," Bayliss points out. "By forecasting sales a year, or month ahead, we can be reasonably sure of a predictable demand for a particular frozen seafood in a trading area."

Terminals Help Monitor Freight Train Movements

LOUISVILLE, Ky. — A computerized communications system is being utilized by the Louisville and Nashville Railroad to control thousands of freight cars traveling to destinations across the country.

Called Ramrod, the system employs high-speed CRT display terminals to keep L&N managers up to date on the arrival and departure of trains at the line's large Radnor yards near Nashville, Tenn.

"Because of the success of our operations in Nashville, expansion of the computerized system is being evaluated to cover operations of dispatching and switching facilities throughout the L&N system," said S.P. Strickland, the line's chief transportation officer.

"This new information capability lets us know how efficiently we're using our equipment. It not only tells where a car is, and how long it's been there, but where it's going and its current status," Strickland said.

"With this information available on request, we can spot potential or actual problems as they are occurring and take corrective action," he added.

Assignments Monitored

As cars are assigned to trains, and as trains leave and arrive at any point, this information is entered directly into the L&N S/360 via remote teleprocessing terminals.

Such information stored in the computers can be recalled by individuals with no special computer training. They merely enter simple English request words into the system, using the terminals.

In a matter of seconds, the computer seeks and displays the answer to any one of thousands of different questions.

Typical of the questions that might be posed to the system are:

- How many loaded tank cars have been in the Nashville yards for more than two hours?
- How many cars of what tonnage are in the Nashville yard, designated for company X and have been there longer than two hours?

Having this minutes-old information available on request helps build trains from cars with common destinations. It also assures that cars are not lost or misdirected throughout the system.



Frozen fish blocks are unloaded for processing.

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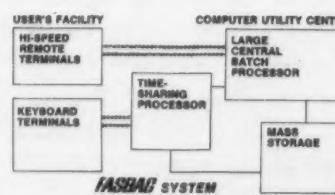
Through University Computing Company's new FASBAC service, scores of remote users can simultaneously utilize the full capability of a very large computer while retaining the quick response and "interactiveness" usually associated with time sharing.

The special FASBAC system developed by University Computing Company interfaces low-speed data terminals in user offices with large computer systems in Computer Utility centers. These low speed terminals provide an effective means of controlling and monitoring large volumes of data transmitted to these large computers over high speed data terminals also located in or near user facilities.

In addition FASBAC users have access to very large, low-cost bulk storage devices linked to the powerful computing systems at the UCC Computer Utility Centers. Files maintained in this storage can be shifted on command by remote users into the central computer for processing, or they can be used as the basis for a centralized remote query service. An important aspect of FASBAC is the hierarchy of processors used to perform various grades of processing assignments thereby in-

suring the most economic handling of a user's computing needs. Finally, the necessary tie up with FASBAC systems and the UCC Computer Utility centers can be achieved with virtually any or all of the low speed and high speed data terminals now in common use. Your becoming a FASBAC user can be as simple as placing a phone call.

FASBAC is an extraordinary achievement. It moves the age of mass computer usage a tremendous stride forward, by putting within the reach of the professional worker in remote locations the computing power he needs and can effectively use for the job at hand. With FASBAC, UCC can now offer an unmatched service, price-wise or performance-wise, to those who have need of effective on-site large scale computing power. For further information, simply write FASBAC, University Computing Company, P. O. Box 6171, Dallas, Texas 75222 or call (214) 741-5781.



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s m t w t f s **calendar** s m t w t f s

Sept. 3,4,5, Boston, Sept. 16,17,18, New York - Project Leadership and Systems Programming Management seminar. Contact: Nate A. Newkirk, 51 Weaver St., Greenwich, Conn. 06830.

Sept. 11-12, Washington, D.C. - Seminar on The Big Squeeze on Corporate Officers and Directors. Contact: Ray V. McDonald, Leasco, 4833 Rugby Ave., Bethesda, Md. 20014.

Sept. 16-17, Chicago - Two-day seminar on Managing Systems Analysis and Design. Contact: Jim Adams, Association for Computing Machinery, Inc., 1133 Avenue of the Americas, New York 10036.

Sept. 16-17, Philadelphia - Techni-rama '69 display of electronic and data instrumentation exhibits. Contact: Alpern Communications, 220 Gulph Hills Road, Radnor, Pa. 19088.

Sept. 18, San Francisco, Sept. 19, Los Angeles - Seminar on PL/I - Techniques and Perspective. Contact: Jim Adams, Association for Computing Machinery, Inc., 1133 Avenue of the Americas, New York 10036.

Sept. 23,24,25, Philadelphia - Computer Room Management course. Contact: Nate A. Newkirk, 51 Weaver St., Greenwich, Conn. 06830.

Sept. 24,25,26, New York - Application seminars for managers and professional people. Contact Mr. Applebaum, Lever Data Processing Services, Inc., Lever House, 390 Park Ave., New York, N.Y. 10022.

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**Urban Problems
Topic of All-Day
ACM Symposium**

NEW YORK - The fourth annual all-day symposium on the Application of Computers to the Problems of Urban Society, sponsored by the Metropolitan New York Chapters of the Association for Computing Machinery, will be held Friday, Oct. 24, at the New York Hilton Hotel.

Keynote speaker will be Dr. Edward F.R. Hearle, a vice-president of Booz, Allen and Hamilton, Inc., a consulting firm specializing in the design of government information systems. Hearle is also president of Urban Regional Information Systems Association.

Principal speaker in the morning plenary session will be Harry Campbell, deputy director of the Rand Corporation's New York program. He will give a general overview of Rand's work with the city of New York.

Following a luncheon, parallel sessions will be held in the afternoon, at which papers will be presented by computer authorities from the university, government, and private sectors on such topics as social implications of computers, urban planning, housing, geographic data bases, air pollution, transportation, police, fire, and simulation.

The program is being held to update the computer community and the general community on the progress that has taken place since last year's symposium and to acquaint participants with the many ways in which computers can be used in the solution of urban problems.

Mrs. Jessica Hellwig, Computer Center, Columbia University, New York, N.Y., has further information on the symposium.

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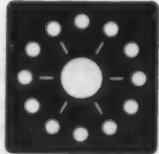
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August 27, 1969

Page 15



Pacific Adds New Units

Thomas P. Phelan (seated), president of the Pacific Coast Stock Exchange, signs contract for two CMC Keyprocessing systems as Morris Schwartz (center), senior partner of Sutro & Co., Los Angeles, and James K. Sweeney, president of Computer Machinery Corp., look on.

It is expected that the new data input systems in Los Angeles and San Francisco will help alleviate the exchange's paper-processing backlog.

In the Keyprocessing system, data is entered through the keyboard and is processed and stored on a magnetic disk unit. After verification is completed, jobs can be transferred automatically, in any desired sequence, from the disk onto a single reel of magnetic tape. This reel then becomes input to the user's main computer.

Control Data Completes Two Acquisitions

MINNEAPOLIS, Minn. — Control Data Corp. has completed the acquisition of both Computing Devices of Canada, Ltd. and Marshall Communications, Santa Ana, Calif.

Holders of about 98% of the outstanding shares of Computing Devices tendered their shares under the share-exchange offer, whereunder one share of Control Data common stock was offered for each five shares of Computing Devices common stock.

Control Data issued 151,761 shares of its common stock under this exchange offer. Computing Devices announced consolidated sales, royalties, contracts, and other revenue for the

nine months ended June 30, totaling \$17,127,000, compared with \$16,910,600 in the corresponding period of the last fiscal year.

Consolidated net income for the nine months was \$682,600, compared to earnings of \$471,000 in the same period last year.

Earnings per share were 88 cents for the first nine months of the 1969 fiscal year as against 61 cents in the same period of 1968.

Computing Devices is primarily engaged in the design, development, and manufacture of advanced aircraft electronic navigation and oceanic systems.

Archie J. McGill Appointed DPF&G President, Top Operating Officer

NEW YORK - Archie J. McGill has accepted an appointment as president and chief operating officer of Data Processing Financial & General Corp.

McGill succeeds Harvey Goodman, who has become chairman of the board and chief executive officer of the company.

McGill, 38, was previously a vice-president of IBM, where he was responsible for IBM market development, a major policy-making function.

Some of his duties over the past several years have included the development of IBM's time-

sharing organization, the planning for long-term growth of data processing within IBM, and the development of applications programs for science and industry (recently announced as separately priced products by IBM).

McGill indicated that his resignation should not be interpreted as a lack of confidence in IBM.

"In terms of my personal interest, I view it as eminently more satisfying to help build an organization that may one day rival IBM in its contribution to the data processing industry," he said.

CUC's Hurd Believes Next Year's Operations Will Show Profits

By A.B. Williams
CW Staff Writer

BOSTON — "Computer Usage Co., Inc. is budgeting profits for the fiscal year beginning Oct. 1, 1969," Dr. Cuthbert C. Hurd, CUC's president and chairman, told CW in an exclusive interview.

The company recently reported a net loss of \$724,507 (85 cents per share deficit), on sales of \$9,447,800 for the nine months ended June 30.

This compared to a profit of \$154,367 (20 cents per share) that included a nonrecurring \$52,605 on sales of \$10,717,195 in the equivalent 1968 period.

In explaining the factors that led to CUC's fifth consecutive red-ink quarter, Hurd emphasized three areas:

- Computer Usage Education (Cue), a relatively new function from which much had been expected, has been closed. This operation consisted partly of high-salaried people (who have been let go) and partly of a fully developed, home education correspondence course in computers.

Marketing rights to the course have been licensed to Bell & Howell and publication rights to McGraw-Hill. These royalties appear to represent nearly cost-free income. CUC has fully written

off development costs of Cue. Hurd said that Cue's program of seminars had been well-received by those who did attend. Cue is fully shut down, as of the last fiscal quarter, except for the royalties and the publishing of the last three of a series of five books on the System/360.

The first two are 360 Concepts and 360 Fortran.

- Computer Usage Business Services (Cubs), another area in which CUC had great expectations, has been largely closed down, with the closeout beginning in July, 1968.

Cubs provided service bureau batch processing of repetitive jobs, such as accounts payable, billing, etc.

Cubs was a deficit producer, and CUC is cutting down on the facilities that added to the cash and earnings drain. CUC has written off fully the capitalized development costs.

Some of the packages that CUC developed for Cubs are being sold on a license basis, and a profitable service function dedicated to Floral Telegraph Delivery is still in operation.

- Computer Usage Development Corp., the company's major functional area, has been experiencing softness in sales over the past several quarters. CUDC provides contract systems and programming assistance to computer users.

Hurd theorized that the general uncertainty about IBM's unbundling, which was prevalent between December of last year and the June 23 announcement, may have had a major effect in CUDC not meeting its sales objectives.

Unbundling Comment

Hurd said, "IBM's systems engineering price umbrella of \$35 per hour offers us a great opportunity to offer more experienced people at competitive or somewhat lower rates.

"The umbrella is also present in the fact that whatever IBM quotes on a systems engineering job, the actual work will be contracted and billed on a time and material basis.

"Actual time, over or under estimate, will be charged."

Hurd added that in general, "IBM's move should lend respectability and recognition to our professional area."

CUC is retaining some tangentially related efforts. A model-building service (with utility and retail already fully developed) is one. This service is marketed out of Baltimore.

The facilities management operation, started in 1965, has been modestly successful and profitable.

Marketing Emphasis

CUC is putting new emphasis on marketing. Their district-level profit centers are in Boston, New York (with a 360/40 for software development and some



Dr. Cuthbert C. Hurd

service bureau functions). Baltimore, Washington (with the usual specialized federal marketing effort), Chicago (360/30 for FTD), Dallas, Houston, Los Angeles, and the Bay Area.

Hudson to Back Telex Disk Units To \$50 Million

TULSA, Okla. — Hudson Leasing Corp. and The Telex Corp. have entered into an agreement whereby Hudson will make available \$50 million over the next four years to implement a portion of Telex's leasing program for disk pack drives.

An announcement made previously indicated similar agreement entered into between Telex and Transamerica Computer Co., Inc.

The latter agreement involved \$45 million available from Transamerica over a three-year period. The two agreements provide a total of \$95 million available for the disk-pack-drive leasing program.

The program will be carried out by the Telex computer products division located in Tulsa. Richard L. Martin, president of the division stated that the disk pack drives are plug-to-plug interchangeable with IBM 2311 and 2314 models.

Marketing and servicing of the disk pack drives will be carried out by the nationwide field organization that has been established by the Telex computer products division.

Farrington/GE Agree On OCR Equipment Sale

NEW YORK — Farrington has entered into OEM agreements with General Electric, under which Farrington will sell page readers and other optical character-recognition equipment to GE. The agreements have a potential value of over \$2 million over a two-year period.

In a related agreement Farrington has agreed to purchase high-speed paper-handling devices from GE's information devices department. These agreements are nonexclusive with first deliveries commencing in 1970.

'Doin' What Comes Natcherly'

CUC Drops Losers, Hopes to Be Winner

By A.B. Williams
CW Staff Writer

CUC appears to be back to "doing its own thing" — systems design and programming.

During the 15 months ended June 30, the company had lost money in two rather disastrous, if promising-looking, attempts to broaden its base of operations in

the industry (see story on page 15).

Computer Usage Education had done poorly, despite having presented useful, informative, and technically interesting projects.

The word "seminar," however, does sometimes carry connotations of utter boredom to the intended audience.

The failure of Computer Usage Business Services is harder to explain with a key word, unless it's competition and a failure to market its repetitive services properly (hard sell, cold calling) against its very powerful competitors.

If we were a small business in need of the kind of service that CUC was selling, we'd probably go no further than one of two places — IBM's Service Bureau Corp. or our own very helpful bank.

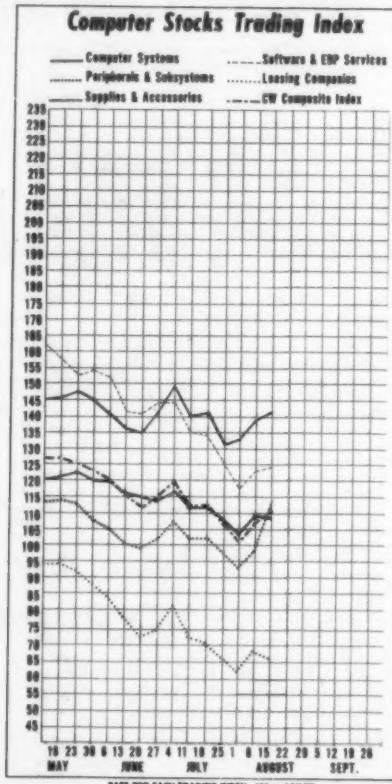
The Future

Both Cue and Cubs are all but defunct as deficit producers. The splinters left represent possible sources of gravy, if CUC's salesman of contract services will put in the selling effort on them.

So the name of the game is contract services, despite also having a profitable service to Floral Telegraph Delivery and a modeling (mathematical, not fashion) group with packages already in operation in the retail and utilities fields.

Dr. Hurd, the company's president and chairman, notes that IBM's unbundling of systems engineering services gives his operation a strong price umbrella.

It would still appear, though, that CUC will most often be one of the companies (they have lots of non-IBM competition) called in as second source, after a user becomes dissatisfied with IBM (or any other manufacturer that gives unsatisfactory service at the larger machine level).



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H. B. SHAIN & Co., INC.

COMPUTER STOCKS: TRADING SUMMARY

LISTED CLOSE 8/14/69 OTC CLOSE 8/15/69

COMPUTER SYSTEMS			
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET % CHANGE CHANGE
N	144-128	144 5/8	BURROUGHS CORP + 6 1/4 4.52
N	69- 38	39 7/8	COLLINS RADIO - 1 1/2 -3.63
N	159-125	151 1/2	CONTROL DATA CORP + 2 1.34
A	72- 54	62 1/8	DIGITAL EQUIPMENT - 2 5/8 -4.05
N	25- 13	15 1/2	ELECTRONIC ASSOC. 1/4 1.64
N	98- 81	83	GENERAL ELECTRIC - 2 3/8 -2.88
N	75- 75	89 1/4	HEWLETT-PACKARD CO - 2 3/8 -2.59
N	146-187	133	HONEYWELL INC --- ---
N	354-291	338 3/4	IBM + 5 1.58
N	139-188	134	NCR + 1 1/2 1.13
N	46- 35	36 7/8	RCA - 1/2 -1.34
N	50- 38	32 3/4	RAYTHEON CO - 2 1/2 -6.43
O	43- 24	29 1/2	SCI. CONTROL CORP. + 1/2 1.72
N	55- 38	43 3/4	SPERRY RAND + 7/8 2.04
A	38- 26	37 1/2	SYSTEMS ENG. LABS + 2 3/4 7.91

PERIPHERALS & SUBSYSTEMS			
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET % CHANGE CHANGE
N	82- 59	62 5/8	ADDRESSOGRAPH-MULTI - 1 3/4 -2.72
O	71- 18	18 1/2	ALPHANUMERIC - 1 3/4 -8.64
N	44- 32	38 1/2	AMPEX CORP --- ---
O	19- 9	16 3/4	BOLT-BERANEK & NEW - 3/4 -6.52
N	17- 9	19 3/4	BUNKER-RAMO - 1/4 -2.27
A	37- 18	24 3/8	CALCOMP + 2 5/8 12.87
O	38- 17	17	COGNITRONICS - 1 1/2 -8.11
N	16- 8	8 3/8	COMPUTER EQUIPMENT - 1 1/4 -12.99
A	27- 12	13	DATA PRODUCTS CORP - 3/8 -2.88
O	22- 13	20	DIGITRONICS + 2 3/4 15.94
N	62- 43	58 1/2	ELECTRON MEMORIES + 6 7/8 13.32
O	18- 8	8 3/4	FABRI-TEX + 9 3/4 108.33
O	37- 19	19 3/4	FARRINGTON MFG - 1 1/4 -5.95
O	21- 18	19	INFORMATION DIS - 1/2 -4.76
N	34- 17	23 7/8	MILGO ELECTRONICS + 1 3/8 6.11
A	87- 59	59 5	MOHAWK DATA SCI. + 1 1/2 1.80
O	118- 54	61	OPTICAL SCANNING - 4 -6.15
O	31- 18	20 1/4	PHOTON + 1/2 2.53
A	35- 23	29 1/4	POTTER INSTRUMENT + 1/4 .86
O	76- 54	61	RECOGNITION EQUIP + 4 7.92
N	61- 22	25	SANDERS ASSOCIATES - 1 3/8 -5.21
O	85- 32	32	SCAN DATA - 5 -13.51
O	36- 16	17	TALLY CORP. + 1/2 3.03
N	100- 85	96 3/8	XEROX CORP - 1/8 -.13

SUPPLIES & ACCESSORIES			
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET % CHANGE CHANGE
O	47- 31	34 1/2	ACME VISIBLE --- ---
N	22- 11	13 1/2	ADAMS-MILLIS CORP - 5/8 -4.42
O	27- 23	23 1/2	BALTIMORE BUS FORM - 1/2 -2.68
A	29- 17	28	BARRY WRIGHT + 3/4 3.98
O	44- 28	28 1/4	DATA DOCUMENTS - 1/2 -1.74
N	42- 28	29	ENNIS BUS. FORMS - 1 3/8 -4.53
N	89- 65	88	MEMOREX + 4 5/8 5.55
N	112- 94	185 5/8	3M COMPANY + 3/4 .72
O	37- 29	31 1/4	MOORE BUS FORMS - 5/8 -1.96
N	46- 36	48 1/2	NASHUA CORP. + 1/2 1.25
O	48- 30	37	REYNOLDS & REYNOLD + 2 5.71
O	31- 23	25	STANDARD REGISTER - 1/4 -.99
N	36- 28	29 3/4	VARCO + 1/4 .85
A	28- 18	11 5/8	WABASH MAGNETICS - 1/2 -1.06
O	34- 28	31 1/2	WALLACE BUS FORMS + 1 3.28

SOFTWARE & EDP SERVICES			
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET % CHANGE CHANGE
O	14- 6	6 1/2	ADVANCED COMP TECH + 1/4 4.00
A	19- 6	29 3/4	APPLIED DATA RES - 1/4 -.83
O	19- 6	7 7/8	ARIES + 7/8 12.58
A	83- 63	76	AUTOMATIC DATA PRC - 1 1/8 -1.46
O	13- 7	7 1/4	AUTO SCIENCES --- ---
O	17- 8	8 1/2	BRANDON APPL SYS - 1 -10.53
A	21- 9	11 1/8	COMPUTER APPL - 1 7/8 -14.42
O	16- 6	9	COMPUTER ENVIRON + 1 1/2 20.00
O	47- 23	23	COMPUTER NETWORK - 1 -4.17
N	30- 19	21 1/2	COMPUTER SCIENCES - 1 3/4 -7.53
O	48- 8	8 1/2	COMPUTER USAGE - 6 -41.38
A	56- 37	54 3/4	COMPUTING & SOFT + 7 5/8 16.18
O	24- 6	6 1/2	DATAMATION SERVICE - 2 -23.53
O	17- 7	8	DATABAB --- ---
O	15- 5	5 3/4	DIGITEK - 1/2 -8.00
A	38- 12	13	ELECT COMP PROG - 1/2 -3.78
O	39- 20	24	INFORMATICS + 1 4.35
O	19- 3	3 1/2	MATRIX CORP. - 1/2 -12.50
O	22- 6	7	NAT COMP ANALYSTS + 1/2 7.69
A	34- 23	34	PLANNING RESEARCH - 3/8 -1.89
O	11- 6	6	PROGRAMMING & SYS --- ---
O	10- 6	7	SOFTWARE SYSTEMS --- ---
O	37- 5	6	STRATEGIC SYH --- ---
O	36- 11	18	TBS COMP CENT INC. - 1 -5.26
O	12- 4	4 3/4	UNITED DATA CENTER - 1/2 -9.52
O	155- 56	64	UNIVERSITY COMP + 3 1/2 5.79
O	38- 22	25	URS SYSTEMS + 1/2 2.04
O	16- 7	7 3/4	U.S. TIME-SHARING - 1/4 -3.13

LEASING COMPANIES			
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET % CHANGE CHANGE
O	14- 8	9 7/8	BANISTER CONTIN - 1/8 -1.25
O	42- 24	24 1/2	BOOTHE COMPUTER - 1/2 -2.00

Aquisitions

Data 100 Corp., manufacturers of computer terminal systems, has made a preliminary agreement to acquire Royal Machine Industries, Inc., a St. Paul, Minn., manufacturer of metal enclosures for computer and peripheral equipment. The agreement involves the issuance of Data 100 common stock in exchange for all of the stock of Royal Machines, which will operate as a subsidiary of Data 100.

New Registrations

ARTHUR D. LITTLE, INC., Acorn Park, Cambridge, Mass. 02140, a company engaged in research, development, engineering, management consulting, and economic services, filed to register 250,000 outstanding shares of common stock. Proceeds, at \$25 per share maximum, intended for capital items and general corporate purposes. The underwriters are Paine, Webber, Jackson & Curtis, 24 Federal St., Boston, Mass., and G.H. Walker & Co., Inc., 15 Westminster St., Providence, R.I.

COMPUTER LEASING CO., 923-15th St., N.W., Washington, D.C. 20005, a company engaged in leasing electronic data processing equipment manufactured by others, filed to register 66,500 outstanding shares of convertible preferred stock and 19,000 shares of common stock issuable upon exercise of common stock purchase warrants expiring September, 1974. Price is \$14.75 per common or preferred share maximum. No underwriter is involved.

SMC COMPUTER SERVICES, INC., 131-135 Howell St., Dallas, Texas 75207, a data processing center for Salamaster, its parent company, filed to register 409,858 shares of common stock. Proceeds, at \$1 per share, intended for purchase of a presently leased computer and for development and purchase of software packages. The underwriter is Schneider, Bernet & Hickman Securities Corp., 3200 First National Bank Bldg., Dallas, Texas.

LEASCO DATA PROCESSING EQUIPMENT CORP., 280 Park Ave., New York, N.Y. 10017, a company engaged in international, computer, and financial services, filed to register 665,773 shares of common stock. Price is \$33-5/8 per share maximum. No underwriter is involved.

EPG Computer Services, Inc. of New York has reached an agreement in principle to acquire, through a subsidiary, all the assets of H.A. DeFrance & Co., Inc., a firm that offers cold-type composition services. The agreement is subject to the approval of the board of directors of EPG and to the signing of a definitive contract.

Data Memory, Inc. of Mountain View, Calif., a magnetic-disk recording systems firm, has acquired **Laser Applications, Inc.** of Palo Alto, Calif. The acquisition will allow Data Memory to combine laser technology with

disk memory systems and to include devices for hard-copy printout from disk memory computer peripherals, optical scanning, and various quality and process-control applications.

Superior Computer Corp. of New York has acquired the business and substantially all of the net assets of the Superior Electronics Division of Aiken Industries, Inc., Clifton, N.J., manufacturer of electronic gun components for both color and black-and-white television tubes. Terms of the acquisition, made for cash and notes, were not disclosed.

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Tally Corp. Reports Loss for 6 Months But Anticipates Profits by End of Year

KENT, Wash. — Tally Corp. reported first six-month's sales of \$4,558,743, with a net operating loss of \$1,374,091. Tally, for the comparable period last year, had an adjusted consolidated sales volume, restated to reflect integration of Tally, Ltd., England, of \$5,207,872 with earnings of \$189,434.

Although the operating losses of last year and this first quarter continued into the three months just ended, James E. Navarre, recently elected Tally president, indicated the company's current financial position is strong and will support the immediate growth of the company.

He further stated that Tally will return to orderly and per-

manent profitability within the fourth quarter of this year.

Navarre, in his report to shareholders, emphasized that the officer level within Tally has been entirely reconstituted since March, with four new vice-presidents now directing the various activities of the company.

Outlining the future sales volume for Tally, Navarre stated tangible growth is forthcoming because of increased plant capacity in its new Kent facility, overall market growth for data transmission systems, inauguration of a new equipment rental program, increased customer acceptance of its new magnetic tape products, start-up of de-

liveries on long-term contracts with IBM and NCR, and increased market penetration by Tally, Ltd., its English sales subsidiary.

Concurrent with the reconstructed management and expanded sales base, Navarre reported the implementation of an effective cost reduction program centered around the capabilities now offered by its new manufacturing facility.

Consolidation of the Santa Ana and London, England, manufacturing operations into the Kent facility, plus improved internal cost control programs, will result in immediate cost efficiencies and permanent profitability for Tally, he said.

Earnings Reports

DATA PACKAGING CORP.

3 Months Ended May 31

	1969	1968
Shr Ernd	\$.26	a \$.04
Revenue	4,124,482	1,570,022
Earnings	400,992	62,773
6 Months	.39	a .13
Shr		
Revenue	7,165,524	3,272,442
Earnings	612,601	188,387

a — Adjusted to reflect two-for-one stock split in May, 1969.

VARIAN ASSOCIATES

9 Months Ended June 27

	1969	1968
aShr Ernd	\$.63	\$.54
Revenue	137,591,000	128,021,000
Spec Cred	b1,251,000	
Earnings	c5,440,000	3,459,000

a — Based on income before special credit; b — Consists of \$1,001,000 from sale of property and \$250,000 from sale equity in Thomson-Varian S.A.; c — Equal to 82 cents a share.

VICTOR COMPTOMETER CORP.

3 Months Ended June 30

	1969	a1968
Shr Ernd	\$.51	\$.41
Revenue	41,113,728	37,085,191
Earnings	2,649,244	2,171,463

6 Months .90 .76

Shr Revenue 78,380,552 72,855,490

Earnings 4,708,761 4,021,121

a — Includes Valley Mfg. & Sales Co., and subsidiary, acquired in December, 1968, on a pooling-of-interests basis.

Pro forma share earnings, assuming conversion of preferred stock, as reported by company, were 51 cents in the 1969 quarter and 91 cents in the 1969 six months compared with 42 cents and 78 cents respectively, in the like periods of 1968.

DATA TECHNOLOGY CORP.

Year Ended May 3

	1969	a1968
Shr Ernd	\$.70	\$.51
Revenue	13,119,000	7,801,000
Earnings	804,000	476,350

a — Combined figures of Data Technology for fiscal year ended April 30, 1968, and Perfection Plastics, Inc. for its fiscal year ended Feb. 29, 1968. The companies were merged in March, 1969.

COMPUTER COMMUNICATIONS

Year Ended June 30

	1968	1969
Shr Ernd	\$.18	
Revenue	2,784,258	\$1,004,214
Earnings	171,696	(99,152)

(Loss)

AMERICAN RESEARCH & DEVELOPMENT

June 30, 1969 June 30, 1968

Asset	Share	\$265.57	\$212.17
Net Assets	407,646,106	325,674,381	

GRAPHIC CONTROLS CORP.

3 Months Ended June 30

	1969	1968
Shr Ernd	\$.28	\$.25
Earnings	230,000	205,000
9 Months	.72	.76
Shr		
Revenue	16,830,000	15,519,000
Earnings	590,000	608,000

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Univac Awarded \$16.7 Million Contract

ST. PAUL, Minn. — A \$16.7-million contract for design and development of a weapons systems computer has been awarded to the Univac Division of Sperry Rand Corp.

The contract between Univac's federal systems division and the

Air Force's Space and Missile Systems Organization calls for fabrication and delivery of 22 computers, which will form the heart of the Minuteman integrated command and control system.

According to a Univac spokes-

man, the computer will provide additional memory relief and take over certain command and control functions now executed by the missile's guidance computer.

Other new tasks the computer will perform include message switching, and processing between launch sites and launch control facilities. It will be installed at both locations.

It has the capability of floating-point arithmetic, including add, subtract, multiply, and divide, as well as normal fixed-point operations. There is 100% upward software compatibility from the minimum configuration. The maximum configuration would be used in the Minuteman launch control facilities.

Contracts

Computer Communications, Inc. has signed a long-term contract with Intelcom, Inc. by which CCI agrees to become systems manager, designer, developer, and supplier of a totally integrated computer-communications system for on-line and time-sharing applications. Intelcom is a recently formed company dedicated to the marketing of on-line computerized systems and services to individual subscribers, to organizations with multiple branch locations, and possibly later to others on an international franchise basis.

Utah Power and Light Co.'s Naughton Generating Station has contracted Bailey Meter Co. of Wickliffe, Ohio, to provide a Bailey 855 computer system, a Bailey 721 electronic analog control system, and a Bailey 660 interposing relay and interlock system to be applied to a Combustion Engineering controlled-circulation boiler firing pulverized coal as the main fuel.

Milgo Electronic Corp. of Miami, Fla., has received a \$288,000 order from North American Rockwell Corp. of Columbus, Ohio, for the design and manufacture of three special-purpose plotters to be part of an intelligence-processing system to be supplied to the Department of Defense by North American Rockwell. The plotters will operate as computer input devices, as well as handling computer output and producing charts from processed intelligence information furnished by a large-scale digital computer.

Data Disc, Inc. of Palo Alto, Calif., has received a \$1-million contract from General Computer Systems, Inc. of Dallas for data memory systems comprising 7200-Series disk memories and Model 1210 disk memory controllers. The data disk memory systems will be incorporated in General Computer's Data/Tape 2100 computer data input systems.

Award of a \$1,978,000 letter contract has been made to the Sylvania electronic systems division, Needham Heights, Mass., for initial production of digital data modems (modulator-demodulators) by the Air Force Systems Command's electronic systems division, Hanscom Field, Mass.

Matrix Corp. of Alexandria, Va., has awarded to URS Systems Corp. of San Mateo, Calif., a nine-month management assistance contract involving general and technical management and administration.

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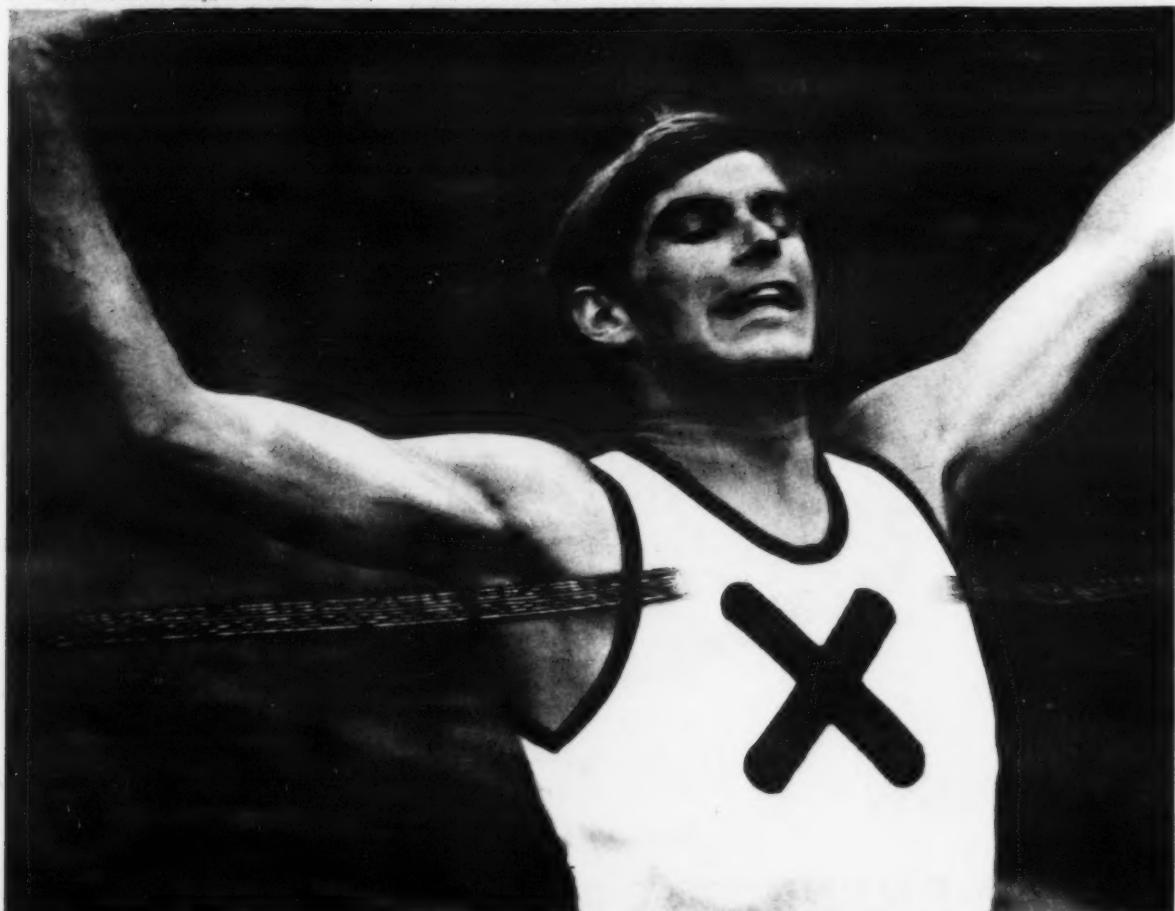
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